

REMARKS

Claims 1-6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Komuro et al. (U.S. Patent No. 6,587,318), in view of Kawato et al. (U.S. Patent No. 6,327,123). In response, Applicant amended independent claims 1 and 5 to clarify that the magnetic head is a current perpendicular-to-the-plane (CPP) type magnetic head, and respectfully traverses. Applicant traverses the rejection of claims 1-3 and 5 because there is no motivation to combine a tunnel magnetoresistive (TMR) sensor of a CPP structure, as taught by Komuro, with an MR sensor of a CPI type (spin-valve sensor of an in-plane structure), as taught by Kawato. Applicant traverses the rejection of claims 4 and 6 because the cited references fail to disclose or suggest, among other things, a magnetic head or disk apparatus that includes tip-end parts that extend beyond a domain control region, on which an electrode having the tip part is provided, with a protruding distance of 0.25 μm or less.

Komuro teaches a TMR sensor of a CPP type that has a sense current flowing perpendicular to the MR film. (See the Abstract). Komuro is silent regarding MR sensors having a CPI structure. Komuro also fails to disclose that the magnetic domain control films are formed on the free layer, as recited in claims 1 and 5 and noted by the Examiner.

Kawato teaches an MR sensor of a CPI structure having a sense current flowing parallel to an MR layer, which is different from the present invention. More specifically, the present invention has an MR head of a CPP type. Therefore, the structure of Kawato is different from the present invention and Komuro. Accordingly, there is no motivation to combine the teachings of Kawato and Komuro since they teach different MR head structures. Moreover, Kawato is not interested in having an effective core width that is

minimized while maintaining a high signal to noise ratio by injecting a sense current selectively into the core region to avoid injection of the sense current into the domain control regions, as in the present invention. For these reasons, withdrawal of the §103 rejection of claims 1-3 and 5 is respectfully requested.

With respect to claims 4 and 6, a tip-end part extends beyond the domain control region on which the electrode having the tip-end part is provided. Moreover, the tip-end part extends with a protruding distance of 0.25 μ m or less.

In contrast, as correctly noted by the Examiner, Kawato discloses a tip-end part of the electrodes that extends beyond the domain control region with a protruding distance of 0.5 μ m. The Examiner also notes that Kawato fails to disclose a protruding distance of 0.25 μ m or less. However, the Examiner asserts that one skilled in the art would modify the protruding distance of the MR head of Komura to be 0.25 μ m or less instead of 0.5 μ m. The Examiner's rationale is that it would improve the reproducing sensitivity of the head (Col. 8, lns. 39-43 and FIG. 7). Applicant respectfully traverses this statement of the Examiner. Col. 8, lns. 37-43 of Kawato states:

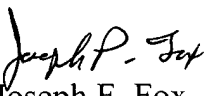
Experimental operation of the magnetic head shown in FIG. 7 proved that the reproducing sensitivity was increased by about 40% when the distance between the pair portions of the magnetic domain control film 41 was greater than the distance between the pair of electrodes 25a and 25b by 1 μ m (0.5 μ m on each side).

Applicant respectfully submits that based on the above paragraph Kawato teaches away from a distance of less than 0.5 μm on each side because the pair portions of the magnetic domain control film 41 needs to be greater than 1 μm (0.5 μm on each side). Therefore, Applicant respectfully submits that one skilled in the art would not modify the MR head of Komuro, as suggested by the Examiner, to decrease a distance between a portion and a domain control wall. Therefore, the advantages of the present invention, as shown in FIG. 5, are not achieved (i.e., the effective core width T_w does not decrease sharply when the overlap distance has decreased to 0.25 μm or less). Instead, using an overlap distance of 0.5 μm , as suggested by Kawato, with the MR head of Komuro would not attain the decrease of the effective core width, or the resultant effects, of the present invention. For these reasons, withdrawal of the §103 rejection of claims 4 and 6 is respectfully requested.

For all of the foregoing reasons, Applicant submits that this Application is in condition for allowance, which is respectfully requested. The Examiner is invited to contact the undersigned attorney if an interview would expedite prosecution.

Respectfully submitted,

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